CONDITIONS DEMANDING EXCISION OF THE GLOBE OF THE EYE.[1]

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IN the division of labor which to-day exists in the medical profession, as well as in so many other fields of labor, the question of the propriety of enucleating an eye will be referred to the specialist in ophthalmology more often than to the general surgeon, and in most cities there are specialists to whom cases involving a more or less chronic course will be almost invariably referred; but there are cases of emergency in which we are called upon to act promptly, and our advice is liable to be asked in consultation in other cases, and it is neither a justification nor an excuse—though much too often advanced, as if actually praiseworthy—to say "I don't pretend to know anything about eyes." Those of us who heard or have read the admirable introduction to his address of the renowned President of the Congress of American Physicians and Surgeons, at its late meeting in Washington, will not soon forget the eloquent warning he there gives against the dangers of a too great tendence to specialism in medicine. It is in this view, rather than that I have anything novel to offer, that I respond to the request of the committee and speak of the conditions demanding excision of the globe of the eye.

In the consideration of this subject, we are at once confronted with it from the two quite different standpoints, according as we have to deal with blind eyes or with those in which there is a more or less useful degree of vision. I shall speak of them separately, and *first*, as to blind eyes.

In these cases the objections to the operation are two: first, the dangers of the operation *per se:* and second, the cosmetic result. The operation has been followed by death from meningitis—before the days of antisepsis more frequently than at present—but the possibility must enter into consideration now.

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I am not aware of this untoward result in other conditions than in suppurative panophthalmitis, but it has occurred in these cases when operated upon in the acute stage sufficiently often to make us well hesitate before undertaking it. I have had one such experience in a man about eighty years of age, who lacerated his globe by a blow from a stick of wood in chopping, and who applied to me only when suppuration of the interior ol the globe was well advanced. My advice for *immediate* excision was not followed, but forty-eight hours of continued intense suffering brought about a change of mind, and although I used all the antiseptic precautions I thought justifiable short of the entire cleaning out of the orbit, he died forty-eight hours later of a suppurative meningitis.

Suppurative panophthalmitis is due to septic infection. A traumatism of some kind, be it a foreign body driven into the globe, a lacerated wound from a blow, or the clean-cut incision of a surgeon's knife, is the usual medium of contamination. Thereby the entrance of micro-organisms of suppuration into one of the most fertile culture media that exists is. secured, and the result is a rapid disorganization of all the interior structures of the globe. Intense pain, partly but not wholly due to the inelasticity of the sclera, but the greater dangers of extension of the inflammation and the invasion of the orbital tissues with bacteria, demand the relief which only the excision of the globe will secure. In order to reduce the suppurative process to the shortest possible period of time, the removal should be made as soon as the evidence of pus is unmistakable, before the patient's strength has been reduced by the pain, loss of sleep, and increased temperature. If we wait until the inflammation has penetrated the sclera and the orbital tissues have become infiltrated with microörganisms, the operation, which before this would have been one of comparative freedom from danger, now becomes serious—so much so that in pre-antiseptic days it was regarded as improper to operate upon acute panophthalmitis by so great an authority as v. Graefe. Even now, with the methods at hand of combating sepsis, it sometimes becomes impossible to guard against the extension of the suppuration along the lymph channels of the orbit to the brain, as the case I have just related shows. In this case, as in one of v. Graefe's and in some others, with like fatal terminations, the patients were of advanced years, and how much a sclerosis of the arteries may have had to do with the extension of the disease to the interior of the cranium I cannot say; but, as there are cases of death from the meningitis without the operation, it is not unreasonable to insist that the operation is better done either before suppuration occurs in cases of lacerating or penetrating wounds with loss of vision, or as soon as the evidences of suppuration are sufficiently plain for us to know what is coming. In early stages it is an operation of comparative innocuousness, in the later it threatens the life of the patient.

There is no one condition for which eyes are so frequently excised as in sympathetic ophthalmitis (threatened or actual), a disease first accurately described in 1844 by Mackenzie, of Edinburgh, and of which, so far as I know, there is no analogue in our catalogue of the evils to which flesh is heir. It is defined to be "an inflammation of an eye *caused* by a preëxisting inflammation in the other." (*Ref. Handbook of the Medical Sciences*, vol. vi. p. 693). In 1857, Pritchard, of Bristol, England, first remarked upon the relief of the inflammation of the fellow-(second or sympathetically affected) eye which followed the removal of the injured or diseased (first affected) eye, and since his advocacy it has been a recognized surgical procedure for therapeutic purposes in suitable cases. How wide are the differences of opinion as to its applicability may be gathered by comparing the utterances of Schweigger, of Berlin, and of Mauthner, of Vienna. Some thirty years ago, the former, in consultation in a case of injury by penetration of a foreign body into an eye, in reply to the inquiry if it would not do to wait for the ophthalmoscopic evidences of sympathetic disease in the second eye before enucleating the injured one, said to me, "When you *see* anything wrong in the fellow-eye it is already too late" (to save it). In 1878, Mauthner wrote: "Hecatombs upon hecatombs of eyes have been sacrificed upon the altar of prophylaxis to the second eye; the spectre of the sympathetic disease has been a philanthropic mantle covering the acquisition of pathological material." And while I repudiate the slur of the last sentence, which I believe that brilliant writer used for the purpose of exciting attention rather than to state a fact, it certainly shows two things: first, that the disease is regarded with dread by those who have it to treat; and second, that the removal of the offending eye (the exciter) is thoroughly believed to have a useful therapeutic effect upon the disease in the fellow-eye (the sympathizer).

The exact pathology of the sympathetic process is still a matter of controversy—reflecting the medical thought of the day. When the great Scotch ophthalmologist first described the disease from a clinical standpoint, he called it "reflex," and regarded it as being propagated from the injured or diseased eye to the fellow along the optic nerve. In 1859, Heinrich Müller, as the result of anatomical investigation of diseased eyes, claimed that the ciliary nerves were the medium of transmission. In 1878, Mauthner suggested, without insisting, that the blood-vessels were the connecting link in the chain of communication (though in justice to Mackenzie, it should be said that he had also made the same suggestion thirty-five years before). During the last decade, Leber, Berlin, and others, but particularly Deutschman, have investigated the subject from the bacteriological standpoint, with the result of convincing themselves, at least, that the process is infective, and that the optic nerves and their sheaths are the channels by which the microörganisms gain access to the second eye. You will doubtless willingly pardon me if I avoid entering at length into this field of discussion. I have referred to it at greater length in an article in the *Reference Handbook of the Medical Sciences*, and Dr. Robert L. Randolph, of Baltimore, has given the subject a thorough investigation in the pathological laboratory of the Johns Hopkins University, publishing his results in the *Archives of Ophthalmology*, 1888, vol. xvii. No. 2, to which I must refer those who wish to pursue the matter further. Suffice it here to say, that to my mind the pathological investigations of the infectious character of the disease are not convincing, and the clinical features are altogether in favor of the view advanced by Heinrich Müller, of the ciliary nerve medium of transmission; and further, the particular subject of our discussion from a therapeutic standpoint, bears out this view better than any other. If the "sympathizer" be affected by reason of the actual presence in it of microörganisms, let the channel of communication be either the blood-vessels or the optic nerve, I cannot understand how the excision of the first affected eye, the "exciter" could stop the process or indeed work any benefit whatever, though in a large number of cases this effect is undoubtedly accomplished.

The beginning of sympathetic disease is usually slight and insidious, though occasionally it is ushered in by a violent and uncontrollable outbreak, which goes on rapidly to the destruction of the organ. In most instances the first symptom is difficulty in using the eye for near work—"it tires easily"; this is soon followed by evanescent attacks of subacute inflammation with pain and slight tenderness, passing off on rest, and by the laity described as "taking cold;" the pain becomes more constant, the tenderness on pressure increases, flashes of light become troublesome. If the eye be now touched carefully with a probe around the cornea in the region over the ciliary body, an area of super-sensitiveness will be elicited, and it is claimed (Bowman) that this is always at a point corresponding to the initial seat of irritation in the other eye (exciter). While there may be a question of this occasionally, it is the fact sufficiently often to be the rule, and has its bearing in the consideration of the medium of transmission of the disease *via* the ciliary nerves.

In a case presenting the symptoms above described with the other eye lost from injury or certain forms of disease yet to be mentioned, it is the duty of the surgeon to advise, in the most unqualified manner, the enucleation of the blind eye. You appreciate that the symptoms enumerated indicate a condition of irritation only; there is as yet no impairment of the special and peculiar function of the organ; no actual loss of vision, and it is in this stage that we look for the best effect of the operation. In most cases, if the source of the irritation—*i. e.*, the blind eye itself—be *now* removed, we may reasonably anticipate a favorable effect on the sympathizing eye; the irritation subsides and the eye continues to perform its function without impairment.

This irritative stage is, however, usually short, a matter of days (although exceptional instances are on record where it has lasted months, even years), and it is more or less rapidly followed by a diminution of vision, the cause of which being recognizable in an organic lesion. This is usually an iritis of the plastic variety, though it may be serous, or a cyclitis, or a choroiditis, or (very rarely) even a neuro-retinitis; in either case there is an actual inflammatory process with production of new-formed material; the condition has passed beyond the irritative stage and is now vastly more serious because of the intractable nature of the process set up. In plastic iritis the effusion of lymph goes on to the blocking up of the pupil, of the filling up of Fontana's space, to covering the lens, it drags upon the ciliary processes, invades the choroid, and terminates in detachment of the retina and disorganization of the vitreous. The serous iritis is liable to take on glaucomatous inflammation, with the degeneration so fatal to vision characteristic of this disease. The lesions of the choroiditis and neuro-retinitis are the effusion of plastic lymph in these structures. It is thus seen that, except in the last-mentioned disease, the sympathetic disease is an inflammation of the uveal tract to which the ciliary nerves are distributed and the distribution of the optic nerve in the sympathizer is almost never affected—indeed, it has been strenuously denied by some observers of large practice that a true sympathetic neuro-retinitis ever occurs, and they hold that this fact is an evidence against the optic nerve medium of transmission from one eye to the other, but when careful observers (E. G. Loring, Knapp, Kipp and others) state that they have seen the beginnings in this form, negative evidence goes for little except as to its infrequency. In the acutely inflammatory stage of the sympathetic disease the removal of the "exciter" is not so beneficial to the sympathizer, indeed, cases are unhappily frequent in which the operation has been positively harmful, adding fuel to an already flaming fire; and yet it is difficult, in view of the want of success of other means of combating the disease, to make up one's mind to decline to do the one thing that in an earlier stage has proved itself to be the most potent single remedy or procedure that we have for treating it. But we must wait until in some way,—and it is beyond the province of this paper to discuss how,—we have subdued the active process, when in period of quiescence to the sympathizer, the exciter may be removed in the hope of preventing another attack.

We must also bear in mind that in a very small number of cases (about 10 per cent.) the sympathetic inflammation may come on *after* the removal of the exciter, and it was thought by a committee of the Ophthalmological Society of the United Kingdom, reporting in 1886 upon 200 cases of this disease, in about 2 per cent. in *consequence* of the operation, both eyes having been quiescent previous to the operation. While the large majority of cases are shown to be benefited by the excision of the exciter, there were a certain very limited number in which we must remain doubtful as to whether the operation was the best thing that could have been done.

The conditions liable to give rise to sympathetic ophthalmitis are as follows: 1. Injuries. 2. Diseases. Of the injuries: *a*, lacerating or perforating wounds so severe that the ultimate result will inevitably be atrophy of the globe; *b*, the lodgment of a foreign body in the interior of the globe; *c*, a penetrating wound involving the ciliary region, *i. e.*, the periphery of the iris, or ciliary muscle, in the cicatrix. Of the diseases: *a*, recurring or chronic irido-choroiditis, from whatever cause; *b*, atrophy of globe, following purulent keratitis or panophthalmitis, and in which ossific degeneration of the retina has taken place; *c*, atrophy of the globe, from any cause, with a painful ciliary region.

It must also be further borne in mind that in none of these conditions does time confer any immunity against sympathetic disease. So long as the irritation exists it is a menace to the other eye. I have had in my practice sympathetic disease starting up thirteen years after the receipt of an injury, and others have reported much longer periods.

There is considerable difference in liability to the disease in the various injuries and diseases. In the first place, this sequence is more frequent after injuries than non-traumatic diseases, and of the injuries nothing is so potent as the lodgment of a foreign body in the eye, assuming, of course, that the organ escapes the dangers of septic infection as the immediate result of the penetration. That septic infection or bacterial growth have nothing to do with the propagation of the disease, witness the frequency of sympathetic disease that follows the dislocation of a crystalline lens, whether accidental from a blow without rupture of the globe, or intentional, as in the operation for couching. A consequence so frequent that the operation has been abandoned.

The pain which comes from the intra-ocular pressure of a chronic glaucomatous degeneration is frequently so excessive as to justify the removal of the offending organ, other means for the treatment having failed.

Of late years the opinion has more than once been expressed that a glaucoma may be occasionally a sympathetic disease, *i. e.*, the glaucomatous process in the second eye being aroused and *caused* by a similar process in the eye first affected. I fail to see more than a coincidence, *i. e.*, the not altogether unusual appearance of glaucoma in the two eyes chronologically consecutive. The results of operative interference do not establish a *prima facie* case either, inasmuch as the gravity of the situation has uniformly induced a double operation, viz., the enucleation of the first-affected blind eye and the performance of an iridectomy on the other; and whilst the enucleation is entirely justified, indeed demanded, we are without data as to its actual value as a therapeutic procedure.

Various diseases of the eye leave the organ in conditions so inconvenient or repulsive in external appearance that the surgeon's aid is sought, for purely cosmetic purposes, to relieve the deformity which is at once unpleasant to the looker-on and a mortification to the patient. A suppurative keratitis has left a staphyloma of the cornea projecting so that the lids cannot close over it. A hydrophthalmia has resulted from an irido-choroiditis of intra-uterine or infantile life; it may be a uniform enlargement of the whole globe, or it may have caused scleral staphylomata of irregular shape around and behind the cornea; these are both disfiguring and (remotely) liable to set up a chronic irido-choroiditis, with sympathetic dangers. There may be a disfiguring opacity of the cornea without staphylomatous projection, and also in dermoid cysts of the conjunctiva covering the cornea. The question of enucleation of the globe comes up in all of these conditions. Are there, however, no procedures that may be substituted, and avoid so severe a mutilation? In the early days of modern ophthalmology, viz., the sixties, abscission of the anterior segment of the globe, more or less extensive, with stitching of the margin of the wound together (more or less evisceration of the contents of the globe being an inevitable consequence), was frequently performed, the opinion being that by leaving a large part of the globe for the muscles to act upon, a freer movement would be communicated to an artificial eye placed over it, and the mutilation be less noticeable. As a matter of fact, however, the result is about the same—the sclera collapses later, the globe shrivels down to a mere knot, and the difference in motion is inappreciable; while sympathetic disease has occurred from the implication of the ciliary nerves in the cicatrix. One such case is enough to condemn the operation. The cosmetic advantage, if it existed, cannot be weighed in the balance against sympathetic dangers. My opinion is decidedly against any of these risky procedures. Enucleation of the misshapen eye, with the introduction of an artificial eye, is the only admissible operation. The modern expedient of tattooing a white cicatrix of the cornea without staphyloma has resulted in sympathetic disease.

The enucleation of blind eyes that are the seat of phosphenes so intolerable as to affect the mental calibre of the patient has been done; but, like so many operations undertaken to relieve a symptom of nerve irritation, with doubtful utility. It is quite as likely to be due to nuclear irritation as to peripheral. The case is usually better treated in some other way.

In regard to the enucleation of eyes only partially blind, it goes without saying that a condition of things which can allow it to be seriously contemplated must apply with greater force to eyes already blind. The chances of accident or independent disease to the remaining eye are sufficiently great to justify the statement that nothing short of the certainty of ultimate blindness to both, or of death, can permit one to consider such a procedure.

Most of the intra-ocular tumors are sufficiently dangerous to life to demand the removal of the organ in which they are contained as the only hope that can be entertained of successfully combating their lethal encroachment. They are of two classes: the granulomata and the sarcomata. The former are not usually suitable for surgical interference; the latter are. These are glio-sarcoma of the retina, and the sarcomas, melanotic or otherwise, of the uveal tract. They are frequently detected by the ophthalmoscope (sometimes without) before they have entirely destroyed vision, and should be removed at the earliest possible moment; and while, if left until they penetrate the sclera and invade the orbital tissues, they almost surely recur and cause the death of the patient; their successful removal with the globe has demonstrated that the most malignant of growths are, in their beginnings, capable of safe and permanent extirpation. Three years ago next month I removed both eyes of a child of two and a half years of age for a glio-sarcoma in each, and the child is still living, well. and healthy. It is true that this case does not, accurately speaking, belong in this classification, inasmuch as the child was entirely blind; but, as it shows that a severe case can be saved, the application to one involving less is evident Before the penetration of the sclera they are veritably encapsulated and comparatively safe for removal; but no one can say how long they will remain so, as it is only a question of time as to when they will break through this barrier and generalize. I regard them as preëminently the most malignant growths that exist: hence the advice.

Extra-ocular growths are of greater variety of histological structure. Besides the dermoid cysts already mentioned, sarcomata of the orbital tissues in both children and adults, and carcinomata of the conjunctiva in adults, occur. The latter may be removed with the globe with a fair prospect of non-recurrence, if the growth has not already spread to the palpebral conjunctiva or beyond.

Sarcomata of the orbit, even when not attached to the globe frequently require its removal in order to get at the whole growth. These are very sad cases. The eye is perfectly good, and it is difficult to persuade the patient, or family, of the gravity of the situation until too late to secure immunity. Not only does the globe require removal, but the entire orbital contents must be extirpated down to and sometimes including the periosteum.

There still remains to discuss whether an eye which contains an appreciable degree of vision should be removed in order to avert a threatened or prospective attack of sympathetic disease in the fellow.

When we consider the extreme obstinacy of the sympathetic disease, its frequent steady progress to total blindness, under the best directed and most active treatment, it is a point of great importance to determine if it be not our duty to take every precaution against either the onset or the progress of the disease. It was to this class that Mauthner inveighed in the quotation given above and it is quite possible that some eyes have been unnecessarily removed for fear of something that was too remote. It is certainly unjustifiable to remove an injured but still seeing eye, though it may be an exciter of sympathetic disease. The result of the operation undertaken after the disease has begun has not been sufficiently successful in arresting the progress of the malady to warrant us in advising the operation, especially as there are many cases on record in which the little that remains of sight in the injured or exciting eye was all the patient had left after an attack of sympathetic ophthalmitis; the eye secondarily affected having gone on to total blindness, the primarily injured one keeping what it had, serving to go about with. The only condition in which I can regard the removal of a still seeing eye justifiable for fear of sympathetic disease is where the foreign body remains in the eye. In these cases the sympathetic disease is so certain to follow that I think I would prefer to take the chances of losing it in some other way.